Caltrans

Construction Storm Water Pollution Prevention Bulletin

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The Storm Water Pollution Prevention Bulletin is prepared by the Storm Water Compliance Review Task Force to aid all projects and operations in maintaining compliance with the National Pollutant Discharge Elimination System (NPDES) permit requirements.

Understanding Sediment Control

Sediment Control Best Management Practices (BMPs) are the most widely used and generally recognized methods for reducing sediment discharges from construction sites. This bulletin will focus on sediment control using linear barriers and provide some suggestions for problem solving.

Linear barriers are used to intercept and detain sediment from storm runoff. Typical linear barriers include silt fence, sand bags, gravel bags and straw bales. Sediment control BMPs work by ponding the runoff for a period of time and allowing the sediment to settle out of the storm water so that it is not carried downstream. This concept is important to understand and will lead to better BMP installations.

Straw bale check dam combined with straw mulch soil stabilization.

Using Linear Barriers

Most sediment control BMPs are made more effective by creating larger ponding areas or configuring the area such that the travel time of the runoff is lengthened. Longer storm water detention time allows more particles to settle to the bottom. The most durable sediment control BMPs do not allow flows to concentrate at one location but spread the load evenly along the BMP.

Typical Challenges

Silt Fences (CD 36)

Silt fences typically fail at locations where runoff flow is concentrated. To relieve the stress in these locations an additional row of silt fence or other linear barrier can be added either up or downstream to create additional ponding areas. When used for inlet protection, additional bracing may be required to withstand storm flows.

Sandbag Barrier (CD 38)

Sandbag (gravelbag) barriers are commonly used for drainage diversion, check dams, low-flow runoff control, and drain inlet protection. Degradation resulting from long-term exposure to the elements or damage caused by construction traffic are the most common sandbag failures. One challenge created by sandbag use at drain inlets is ponding into the travel way. Usually, additional sediment controls and soil stabilization can be implemented upstream to reduce this problem. If necessary, the flow through a sandbag can be increased by using gravel. This results in less effective sediment removal but is a safer alternative.

Check Dams (CD 34)

Check dams fashioned from sandbags, rock, or straw bales are often used to trap sediment in a channel or ditch, with rock being the preferred material. Check dams generally have limited sediment storage capacity. They are typically used to slow runoff velocities and reduce channel scour and work best for low velocity flows draining less than 4 ha (10 ac). Check dams should be used cautiously so that channel flows are not obstructed to the point that failure can result in flooding travel ways or adjacent properties.

Straw Bale Barrier (CD 37)

Straw bales are generally used interchangeably with silt fence. Although less expensive than silt fence, straw bales have more drawbacks: they deteriorate more rapidly than silt fence and require repair or replacement to maintain effectiveness; gaps between bales can concentrate flows and result in the discharge of sediment laden flows; straw bales can float and should not be used in areas subject to highly concentrated flows, channel flow or live streams.

Linear Barriers are Most Effective When

- Located along a contour line (level line).
- Terminated by angling the barrier uphill past the ponding limits.
- Embedded into the grade to prevent undermining. Silt fences should be buried at least 6" deep with an additional 6" placed horizontally at the bottom of the trench per CD 36. Straw bales must be embedded at least 4" and secured per CD 37.
- Sufficient area and grade are provided to maximize the volume of ponded water. For example, moving a silt fence away from the toe of the slope will increase the ponding area and hence the effectiveness.

Maintenance

Regardless of the BMP implemented, maintenance is critical to success. If a BMP is installed properly with some thought as to its function, the failure rate and subsequent maintenance will be substantially reduced. If implemented properly, the maintenance of most BMPs will only involve the removal of deposited silt after normal storm events.

Additional information is available in the Caltrans Storm Water Quality Handbooks. Questions or comments may be directed to:

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